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ABSTRACT

This teaching guide is especially oriented for the English as a second language (ESL) instructor who has had no previous training in articulatory phonetics, though it may be useful to the expert phonetician as well. It suggests that the ESL instructor consider the use of some basics of articulatory phonetics in teaching pronunciation according to a simple method involving: (a) pictorial illustrations, (b) familiarization with phonetic symbols, and (c) lists of minimal pairs. The objective is to aid the student to adapt his organs of speech to the articulatory processes of unfamiliar, hard-to-pronounce sounds of English or sounds that are similar to those in his language but differ in some points of articulation. This necessitates intensive oral-aural drilling using minimal pairs accompanied with pictorial illustrations. As the students gradually learn to use their organs of speech for new functions, they begin to auditorily differentiate and assign phonemic values to sounds that had always seemed to sound alike. Vocabulary building and dictionary skills are inevitably added benefits. (Author/CFM)

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ARTICULATORY PHONETICS AND CONTRASTIVE SOUNDS:
An Effective Method of Teaching English Pronunciation

A Teaching Manual
For
ESL Instructors

By

PHILEMON ZACHARIOU
ESL Instructor

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ARTICULATORY PHONETICS AND CONTRASTIVE SOUNDS:
An Effective Method of Teaching English Pronunciation

ERRATA

Page	Item	It reads	It should read
3	paragraph 1.12	(Figure 2.)--->	(Figure 1.)
23	table	Table 4 ------->	Table 4.
23	paragraph 4.22	bet-pet ------->	bet-bed
34	(Please see new page attached and a copy of it. Please disregard other page 34 and copy.)		

Philemon Zachariou

Philemon Zachariou

TABLE OF CONTENTS

		Page
	Table of Contents	i
	Introduction	1
	PART I	
1.00	THE ORGANS OF SPEECH	2
1.10	The Speech-Producing Mechanism	2
1.20	The Oral Cavity	3
1.30	Vocal Cords, Glottis, Epiglottis	3
1.40	Velum, Uvula	6
	Suggestions and Comments	6
	PART II	
2.00	PHONETIC ALPHABET	6
2.10	Symbols and Transcription	6
2.20	Other Alphabets	8
2.30	Alphabet in this Work	8
	Suggestions and Comments	9
	PART III	
3.00	ARTICULATION OF VOWELS	9
3.10	Introduction	9
3.20	The Vowel Diagram	10
3.30	Front Vowels	18
3.40	Central Vowels	18
3.50	Back Vowels	19
3.60	Diphthongs	19
	Suggestions and Comments	21
	PART IV	
4.00	DESCRIPTION OF CONSONANTS	22
4.10	Introduction	22
4.20	Stops	23
4.30	Continuants	24
	Suggestions and Comments	26
	PART V	
5.00	MINIMAL PAIRS	28
5.10	Definition and Purpose	28
5.20	Front Vowels	29
5.30	Front and Central Vowels	30
5.40	Central Vowels	30
5.50	Back Vowels	31
5.60	Central and Back Vowels	31
5.70	Diphthongs	32
5.80	Multiple Contrasts of Vowels and Diphthongs	32
5.90	Consonants	33
	Suggestions and Comments	36
	Bibliography	37

ARTICULATORY PHONETICS AND CONTRASTIVE SOUNDS:
An Effective Method of Teaching English Pronunciation

Philemon Zachariou

INTRODUCTION

This treatise purports to be a mere suggestion to the ESL instructor. It is to suggest that he or she consider the use of some of the basics of articulatory phonetics in teaching pronunciation to the ESL student according to a number of simple steps outlined here.

Though this treatise is especially oriented for the ESL instructor who has had no training in phonetics, its use will prove beneficial to the expert phonetician as well. Its general content covers areas that will assist both the instructor and the student at all levels of instruction--Secondary, College, Adult.

The main objective underlying this work evolves around the need of the ESL student, which is psycholinguistic in nature. Simply, the student's pronunciation and enunciation depend greatly on the degree of confidence he feels about the way a word should be uttered. If confident enough, the student may be prompt to use a certain word as needed. Not being confident enough, on the other hand, he may avoid using that word seeking a substitute word, or perhaps sheepishly mumble it. This lack of confidence may stem from a lack of adequate drilling in the area of articulatory phonetics. A quick overview of the speech mechanism, therefore, couple with familiarization of phonetic symbols could prove a most effective way of dealing with this need of the ESL student.

What the student needs, then, is to learn to adapt his organs of speech to the articulatory processes of unfamiliar, hard-to-pronounce sounds of English or sounds that are very similar to those in his language but differ in some points of articulation. This necessitates intensive oral-aural drilling using minimal pairs accompanied with pictorial illustrations. As the student gradually learns to steer his organs of speech to new functions, he begins to auditorily differentiate and assign phonemic values to sounds that had always seemed to sound alike. Vocabulary building and dictionary skills are inevitably added benefits.

Some of the limitations of the scope of this treatise must be noted. Firstly, by no means does this constitute an in-depth study of any particular aspect within the discipline of articulatory phonetics *per se*. Some areas are barely touched upon, though other areas are dealt with somewhat

more extensively. No mention is made of suprasegmental features (stress, pitch, juncture), for instance, very little of length. Secondly, only those areas of study have been taken into consideration which seemed necessary in formulating a method of teaching geared to meet a specific need. The method itself as described and prescribed in the next few pages should thus be simple enough even for the inexperienced teacher to follow. The steps are simple, and specialized terminology is used at a minimum. Teaching pronunciation contrasts is not anything new, of course. Nor is it a method that should be utilized by the few.

Furthermore, the description of sound segments and contrasts is simplified so as to point out the most essential aspects of their qualities. Part III, the section on vowels, is to emphasize the practicality of the vowel diagram. Likewise Part IV, the section on consonants, is to emphasize the effectiveness of pictorial illustrations in teaching articulatory contrasts. Each section concludes with some suggestions and comments on the highlights of discussion. The reason for any detail in all five sections is to facilitate the instructor who might otherwise have to consult volumes of other works on the subject, until he or she is ready to go beyond the subject matter in this work.

The analysis and interpretation regarding the vowels as supported in this work is based on the principle of simplicity and effectiveness rather than on accuracy of detail. It is nevertheless up to the discretion of the individual instructor to adhere to the analysis or interpretation that best fits the needs of his class, as one can readily attest to the fact that there exist among ESL instructors, as it were, dialectal differences.

It was mentioned earlier that this treatise is merely a suggestion to the ESL instructor. Suggested below are four simple steps which are but the outline of this work:

1. Show diagrams of the organs of speech.

2. Show diagrams of tongue positions and explain the vowel diagram (using phonetic symbols).

3. Show diagrams of articulation of consonants (using phonetic symbols).

4. Consult sources on minimal pairs.

PART I

1.00 THE ORGANS OF SPEECH

1.10 <u>The Speech-Producing Mechanism</u>

1.11 Some simple diagrams of our speech-producing mechanism appear below. Since we label sounds (or segments) according to the articulators that make them, it will be useful to "see" these areas in relation to each other. The same mechanism produces the consonants and the vowels and their variants.

1.12 We know, of course, that the lungs provide the source of energy for speech--the outgoing breath. Bursts of air are emitted through the aperture (or opening) between the two vocal cords. This opening is called glottis. The vocal cords are housed in the larynx. (Figure 2.)

1.13 In order to identify the sounds of the language, we must know the articulators: the lips, teeth, tongue, hard palate, velum (or soft palate), uvula (tip of the velum), and the parts of each. As the air is emitted from the lungs and passes through the glottis, it travels through the pharynx, the oral cavity (or mouth), or the nasal cavity. (Figure 1.)

1.20 The Oral Cavity

1.21 The roof of the mouth begins with the tooth ridge (or alveolar ridge), the upper gums behind the upper front teeth. Behind the tooth ridge is the hard palate, the bony structure of the roof of the mouth. The rest of the roof area is the velum, the fleshy area that ends in a hanging tip, the uvula. Though the line between the hard palate and the velum is not visible, you can feel it with your finger or the tip of your tongue.

1.22 The tongue is a complex combination of muscles. The internal structure of the tongue does not concern us. It is the upper surface of the tongue which concerns us. Since there are no natural divisions in the tongue, we need to impose some arbitrary ones in order to obtain accurate descriptions of sounds. Thus the part lying nearest the front teeth is called the tip (also known as point or apex); the part just behind the tip and which is lying directly below the tooth ridge when at rest is the blade; the part below the hard palate is the center (also middle or front); and the part below the velum is the back (or dorsum). (Figure 2.)

1.23 Within the mouth the tongue is capable of a wide range of movements: it can move forward or backward, up or down, or in various ways; its muscles which compose it can be tensed or relaxed. All these adjustments involve changes in the vocal quality.

1.30 Vocal Cords, Glottis, Epiglottis

1.31 The larynx (or voice box) is evident externally as the "Adam's apple." It is a continuation of the trachea (or windpipe). The vocal cords are housed in the larynx. They are two elastic strips of voluntary muscle forming a valve. (Figure 3.) When open (breathing state), the cords spread in a "V" formation with the point in front. (Figure 4.) The opening between the vocal cords is the glottis.

1.32 The epiglottis is the thin, triangular lid of cartilage that folds back to cover the opening of the windpipe during swallowing, thus preventing food, liquid, etc. from entering the lungs.

1.33 During the production of a voiced sound the vocal cords are closed to the point of phonation. Hence, the vocal cords are in vibration. During the production of a voiceless sound the vocal cords are not in vibration. The significance of this contrast will become evident during the discussion of consonants and minimal pairs.

1.34 Voiceness and voicelessness of sounds can be determined in a very

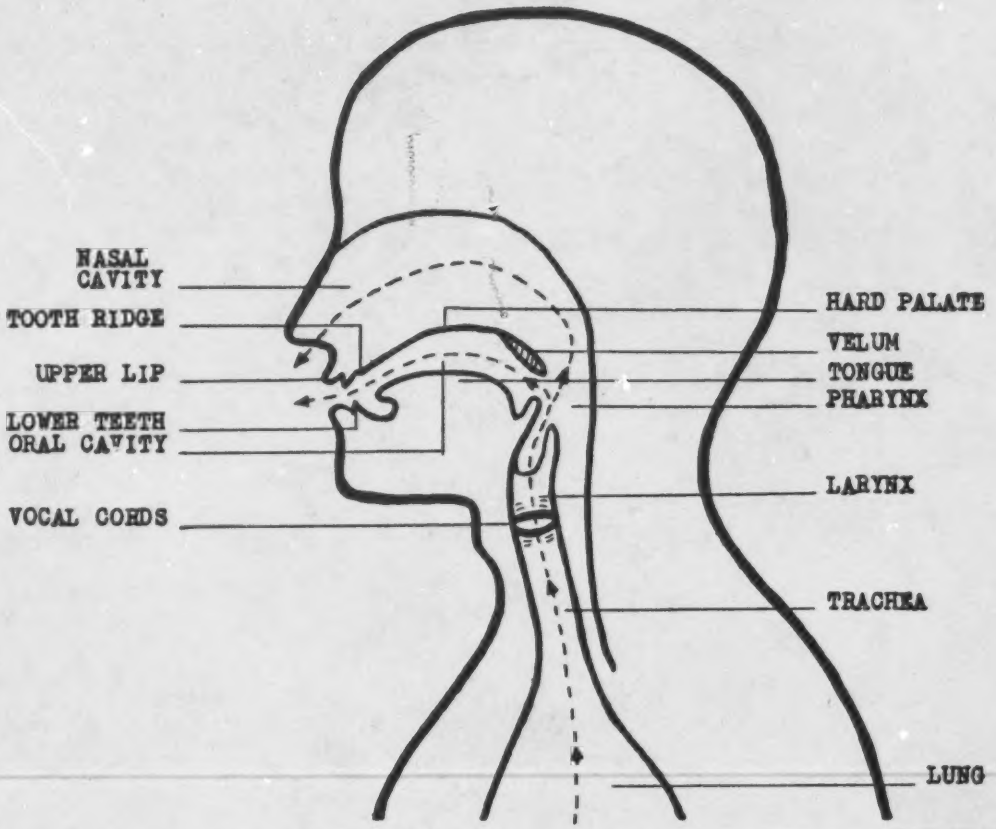

Figure 1. Diagram showing the various speech-producing organs.

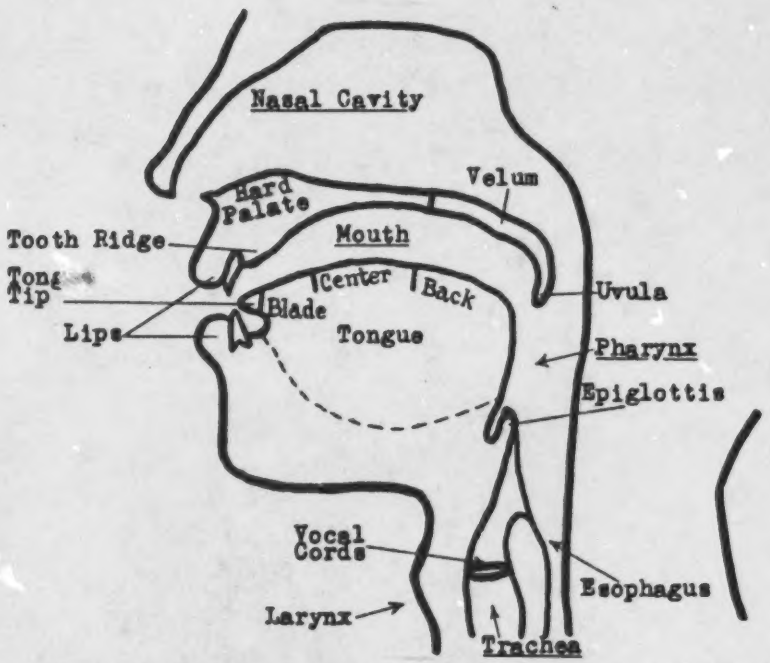

Figure 2. Air passages and parts of tongue and palate.

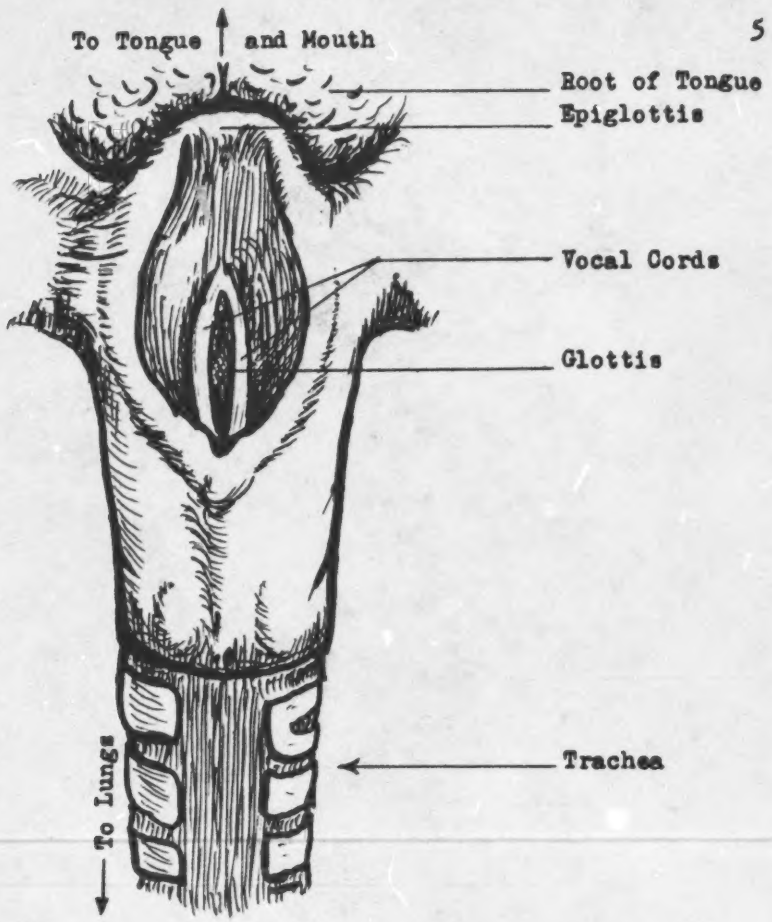

Figure 3. Superior view of the larynx.*

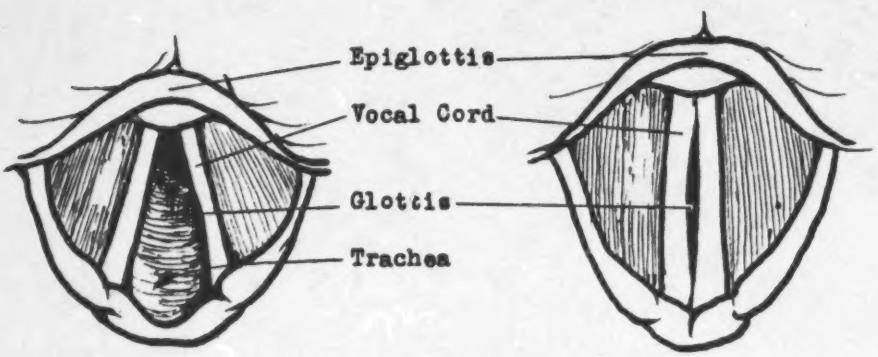

Figure 4. Vocal Cords at rest. (breathing state)

Figure 5. Vocal cords vibrating producing voice. (phonation state)

*Based on the work by Arthur J. Bronstein, The Pronunciation of American English, New York: Appleton-Century-Crofts, Inc., 1960, pp. 63-4.

practical way. Simply have your students place their forefinger on their "Adam's apple." As they now produce the voiced sound v, for instance, they will feel the vibration of their vocal cords. As they produce its voiceless counterpart f, they will feel no vibration. Another way of accomplishing this is by pressing their palms against their ears while producing these sounds. The effects will be readily obvious.

1.40 Velum, Uvula

1.41 The velum (or soft palate) can be raised to block the air from entering the nasal cavity, as in the formation of vowels and oral consonants, or lowered, as in the formation of nasal consonants. The uvula, the tip of the velum, has no power of independent muscular activity. It can be made to vibrate (as in the production of the French uvular trill [R]).

Suggestions and Comments

Diagrams and knowledge of the basics of the speech mechanism always capture the interest of the ESL student. A solid piece of education in itself, this part of study of articulatory phonetics is easily taught, understood, and applied. A simple diagram like Figure 2 is all that is needed at this point. The instructor should be sure to point out the various areas of articulation and the arbitrary divisions of the tongue.

After going over the basics of the speech mechanism with the class, the instructor may have the students draw diagrams pointing out the various areas discussed. He may also give the class written and oral exercises for reinforcement. Learning the nomenclature, particularly of the articulators and their parts, is vital. The student will not only understand the description of sounds later; he will begin to make conscious efforts to steer the parts of his speech organs to the various positions and functions of the articulators as described.

PART II

2.00 PHONETIC ALPHABET

2.10 Symbols and Transcription

2.11 Phonetic transcription is an interpretation of speech utilizing an alphabet system such as the IPA (International Phonetic Alphabet) so as to represent all the sounds of a language without any overlap. The most frequently used phonetic alphabet in phonetic transcription is the IPA. Sounds transcribed phonetically are placed within a pair of square brackets ([ ]), whereas sounds transcribed phonemically are placed within a pair of strokes (/ /). It would be rather too early--if not unnecessary-- for the ESL student at this time to study the difference between phonetic and phonemic transcription.

2.12 In order to familiarize students with the IPA as it applies to American English, a number of key words containing each of the sounds are presented below. (Table 1.)

Table 1.

Phonetic Alphabet and Key Words*

IPA Symbols	Examples	IPA Symbols	Examples
[a]	large	[n]	nest
[aɪ]	First sound of [aɪ] in fly lie	[ŋ]	sing
[aʊ]	loud	[o]	notation
[ɑ]	palm	[oʊ]	toe
[æ]	mat	[ɔ]	law
[b]	be	[ɔɪ]	toy
[d]	do	[p]	peel
[dʒ]	Jew	[r]	reel
[e]	vacation	[s]	see
[eɪ]	date	[ʃ]	she
[ə]	soda	[t]	tea
[ɛ]	met	[tʃ]	chew
[f]	face	[θ]	thing
[g]	get	[ð]	this
[h]	heel	[u]	tool
[i]	seed	[ʊ]	took
[ɪ]	bit	[ʌ]	up
[j]	yet	[v]	vain
[k]	king	[w]	woe
[l]	lie	[ʍ]	when
[m]	meet	[z]	zest
		[ʒ]	casual

*Adapted from Claude M. Wise's Applied Phonetics, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1957, pp. 25-30.

2.20 Other Alphabets

2.21 Symbols such as the ones below (Table 2) are frequently used in various works as well.* The advantage of adopting these symbols is that most of them can be typed on an ordinary typewriter.

Table 2.

/p/ pop	/θ/ three	/m/ Ma'am
/b/ barb	/ð/ this	/n/ nine
/t/ tight	/s/ sauce	/ŋ/ wing
/d/ did	/z/ zeroes	/l/ little
/k/ kick	/š/ shoe	/r/ roar
/g/ gag	/ž/ measure	/y/ you
/f/ fife	/č/ church	/w/ way
/v/ valve	/ǰ/ judge	/h/ he
/iy/ beat	/ə/ above	/ɔ/ all, caught
/i/ bit	/a/ father, lot	/aw/ now
/ey/ bay	/uw/ boot	/ay/ eye
/e/ bet	/u/ book	/ɔy/ boy
/æ/ bat	/ow/ show	

2.30 Alphabet in this Work

2.31 There are, of course, other phonetic alphabets and/or symbols used in transcribing the English sounds, the examination of which is far beyond the scope of this work. But perhaps a compromise between the two alphabets described above may prove most practical for the purpose intended, since it seems to combine the benefits of both: most symbols can be typed on an

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*Francis A. Cartier and Martin T. Todaro, The Phonetic Alphabet (sec. ed.), Dubuque, Iowa: Wm. C. Brown Company Publishers, 1971, p. 73.

*Don L. F. Nilsen and Alleen Pace Nilsen, Pronunciation Contrasts in English, New York, N.Y.: Regents Publishing Company, Inc., 1971.

*Harriette Gordon Grate, English Pronunciation Exercises for Japanese Students, New York, N.Y.: Regents Publishing Company, Inc., 1974.

ordinary typewriter; the symbols do not overlap (as in the case of /e/ as in bet and /ey/ as in bay, for instance (see Table 2)); and it is the phonetic alphabet which may be found used in many works in the field.

Table 3.

/b/	bib	/f/	fluff	/m/	mom	/š/	show
/d/	did	/v/	valve	/n/	none	/č/	church
/g/	gag	/θ/	math	/ŋ/	song	/ž/	leisure
/p/	pop	/ð/	breathe	/l/	lull	/j/	judge
/t/	tight	/s/	sauce	/r/	roar	/w/	water
/k/	kick	/z/	zebras	/h/	have	/y/	you
/i/	see	/ɛ/	bed	/ɔ/	all	/u/	food
/ɪ/	it	/æ/	bad	/o/	floor	/ə/	sofa
/e/	(see /eɪ/)	/a/	father	/ʊ/	good	/ʌ/	bus
/aɪ/	cry	/eɪ/	date	/ɔɪ/	employ	/oʊ/	slow
/aʊ/	how						

Suggestions and Comments

Initially the emphasis concerning phonetic transcription should be on reading rather than transcribing. All that the student needs at this point is to be able to associate phonetic symbols with sounds. With time and practice the student will be able to "see" those symbols in the words he hears or uses. Regardless of the phonetic alphabet used, the instructor should gradually point out other symbols as well, especially their IPA equivalents. One great advantage in using phonetic symbols is the fact that the ESL student as a rule has already had some exposure to the role of such symbols by means of having used his dictionary. It is partly because of this fact that the student will anticipate the benefit of studying phonetics. He now feels he is one step ahead.

PART III

3.00 ARTICULATION OF VOWELS

3.10 Introduction

3.11 Having discussed the significance and role of phonetic alphabets in general, and having suggested a model alphabet, there now remains the need to apply our model to the analysis of the English sounds. It should be remembered that a phonetic alphabet is used to transcribe what a word sounds like and nothing else. However, it is a fact that a word may be pro-

nounced in more than one acceptable way, as there are various dialects in English. The question is then raised, WHICH DIALECT ? That is, the symbols are here available for the analysis of many dialects of English. But which one?

3.12 The answer to this question may be found in the words of Cartier and Todaro. They suggest what they call the "C dialect." In their words;

> When an arbitrary choice of dialect had to be made... we chose that of a Californian with professional training and experience in commercial radio broadcasting. His dialect would have been labeled 'General American' before more careful study of U.S. dialect geography raised doubts about that term.... In any case, English teachers who are not themselves native speakers of English may take it as a model without fear of censure. It is a typical American dialect...used in testing foreign military personnel...."
>
> We call this dialect, quite arbitrarily, 'C dialect.' The reader may take 'C' to mean whatever he chooses: California, Cartier, common, communication, chose, or, probably best, simply 'C.' Skillfully spoken, it will sound to most phonetically naive Americans like the standardized dialect commonly used by anonymous announcers on U.S. network and television."*

3.20 The Vowel Diagram

3.21 "One picture is worth a thousand words." This saying holds true in the description of vowels and consonants. It has long been the custom to explain the relationship of vowels to each other by means of diagrams such as the ones below. The diagram originated as a vowel triangle and gradually evolved in various publications on phonetics as a four-sided figure, geometrically described as a trapezium. The method of developing the diagram came about by means of X-ray photographs. A series of X-ray photographs was made to show the positions of the tongue in the articulation of vowels. It was found that the arch of the tongue was outlined in successive steps, each corresponding to a different vowel. The positions of the tongue and other vocal organs are clearly seen in Figure 6, based on data from X-ray photographs.

3.22 In considering the position of the tongue in relation to a certain vowel, it should be remembered that it is the highest point of the arch of the tongue that is of primary importance. It is the highest point of the arch of the tongue that is represented in a vowel diagram. The vowel /i/ as in heed is produced while the highest point of the arch of the tongue is near the front of the mouth, for instance; whereas the vowel /u/ as in who'd is produced while the highest point of the arch of the tongue is near the back of the mouth. (Figures 6, 7, and 8.)

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*Francis A. Cartier and Martin T. Todaro, op. cit., pp. 1-2.

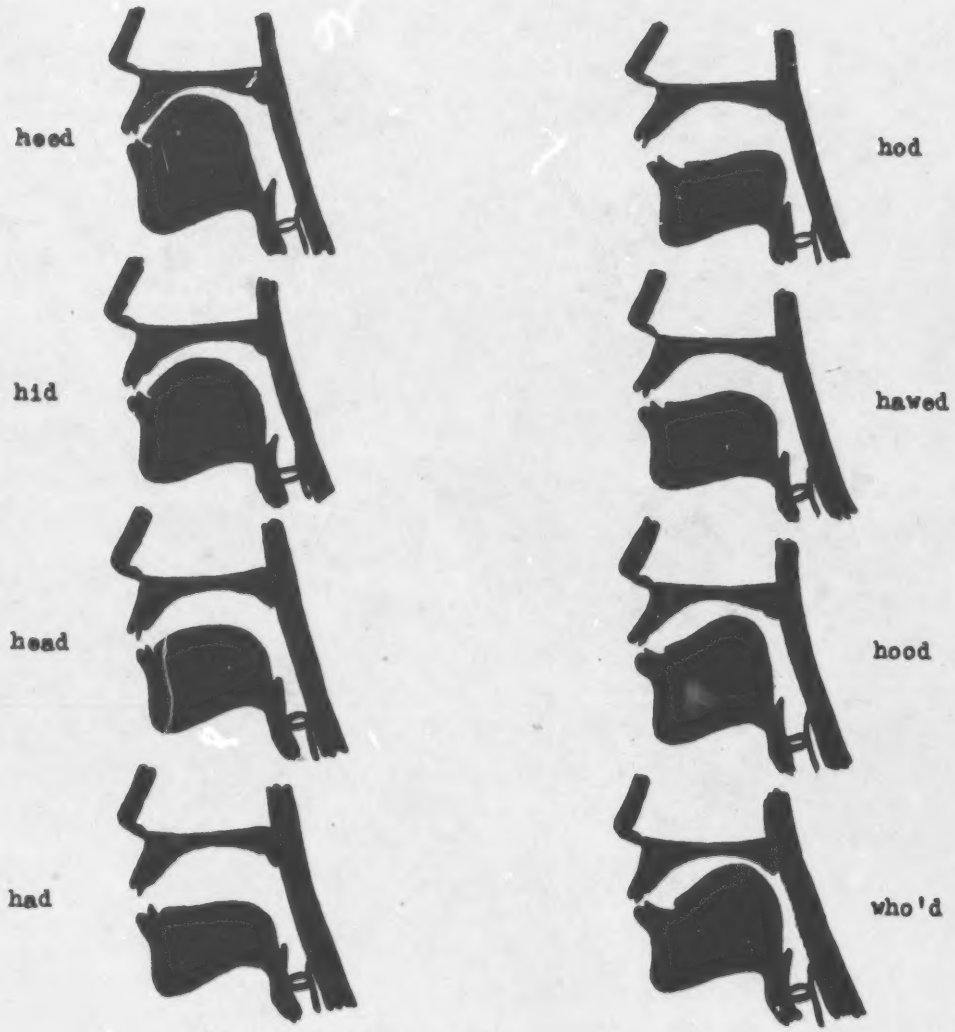

Figure 6.*

Outline of tongue positions and vocal organs during articulation of the vowels in the words heed, hid, head, had, hod, hawed, hood, who'd.

*Adapted from the work by Peter Ladefoged, Elements of Acoustic Phonetics, Chicago and London: The University of Chicago Press, 1962, p. 97.

3.23 Summarized, Figure 6 may be reduced to two other diagrams (Figures 7 and 8), the one showing the approximate tongue positions in the articulation of the vowels in the words heed, hid, head, had, and the other in hod, hawed, hood, who'd.

Figure 7.

Approximate tongue positions of the vowels in heed hid head had.

Figure 8.

Approximate tongue positions of the vowels in who'd hood hawed hod.

3.24 Vowel diagrams may vary according to the author's interpretation or taste. For the sake of clarification, a number of such diagrams from various works have been adapted below. A model diagram will be suggested later. (Figure 16.) In using these diagrams, it is necessary to keep in mind the following points:

1. Each position on the chart corresponds to the highest point of the arch of the tongue during the formation of that vowel.

2. It is assumed that the speaker is facing to the left; hence, front refers to the front of the mouth.

3. A vowel is rounded when the corners of the lips are brought forward.

4. Tense and lax are terms referring to the degree of muscular tension of the tongue muscles. (See 3.29.)

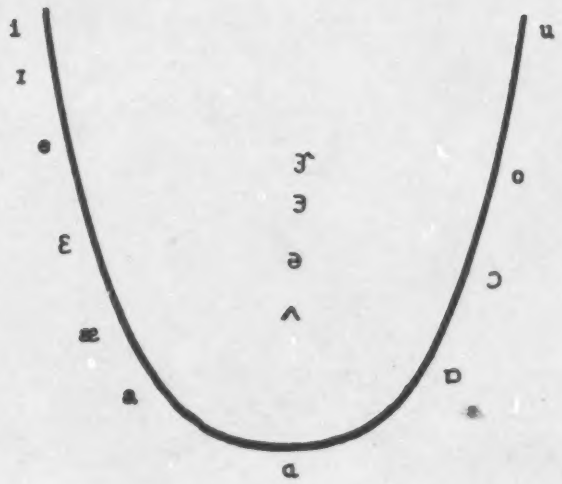

Figure 9.

The relative tongue positions of the vowels.*

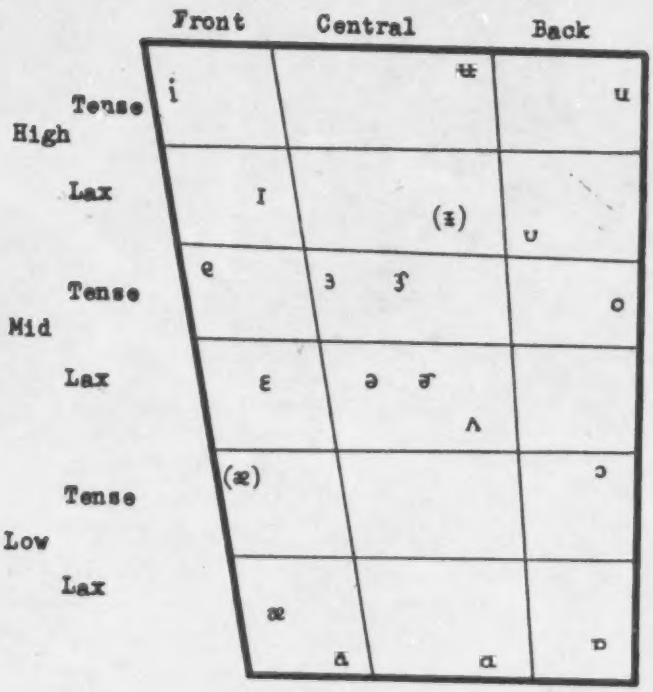

Figure 10.

The tongue positions of the American English vowels.*

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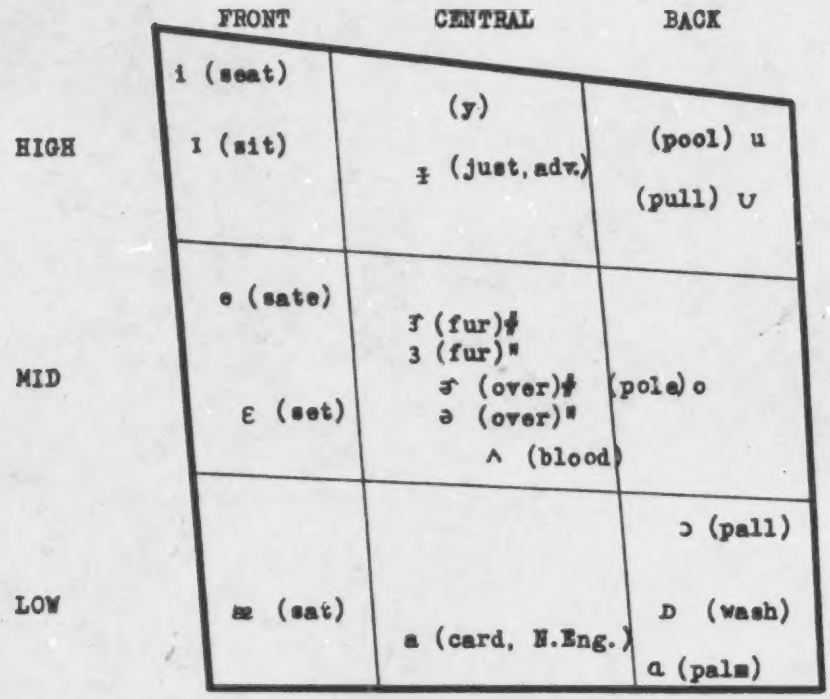
*Arthur J. Bronstein, op. cit., pp. 136, 141.



#r-colored. "r-less.

Figure 11.*

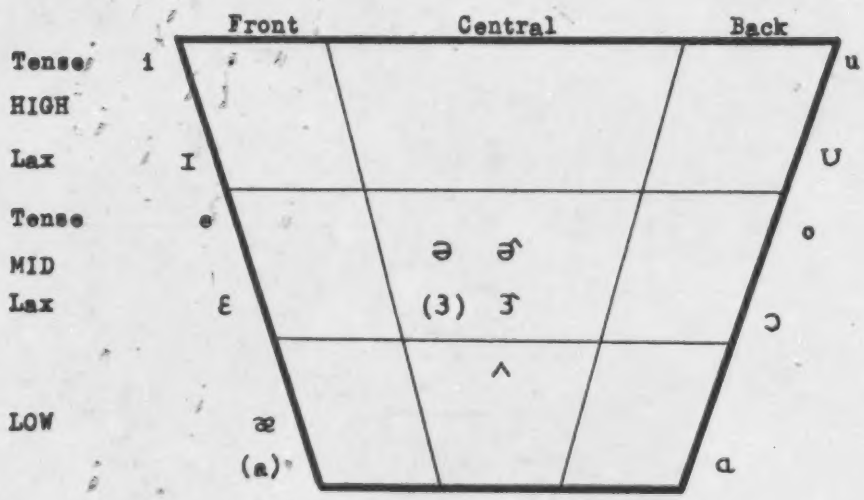


Figure 12.**

*James D. Gordon, The English Language: An Historical Introduction, New York: Thomas Y. Crowell Company, 1972, p. 44.

**Sadanad Singh and Kala S. Singh, Phonetics: Principles and Practices, Baltimore, London, Tokyo: University Park Press, 1976, p. 56.

3.25 The preceding four vowel diagrams (pages 13 and 14) suggest a minimum of fifteen to a maximum of twenty vowels in English. A complex vowel diagram such as Figure 10, for instance, could hardly be adopted by the average ESL teacher in the United States. Excepting perhaps Figure 12, none of the above diagrams would be descriptive of the vowels of the "C dialect" mentioned earlier, especially if it concerned "...that of a Californian with professional training and experience in commercial radio broadcasting." (See 3.12.) Although the English spoken in California has not been singled out as if it were a dialect per se, it is up to the experience and judgment of the ESL teacher (in California) to interpret what Cartier and Todaro mean by "C dialect."

3.26 The following three diagrams are, by comparison, much simpler. Should the ESL teacher consider extreme simplicity, one of these three vowel diagrams or, at least, an adaptation thereof, may prove worth adopting.

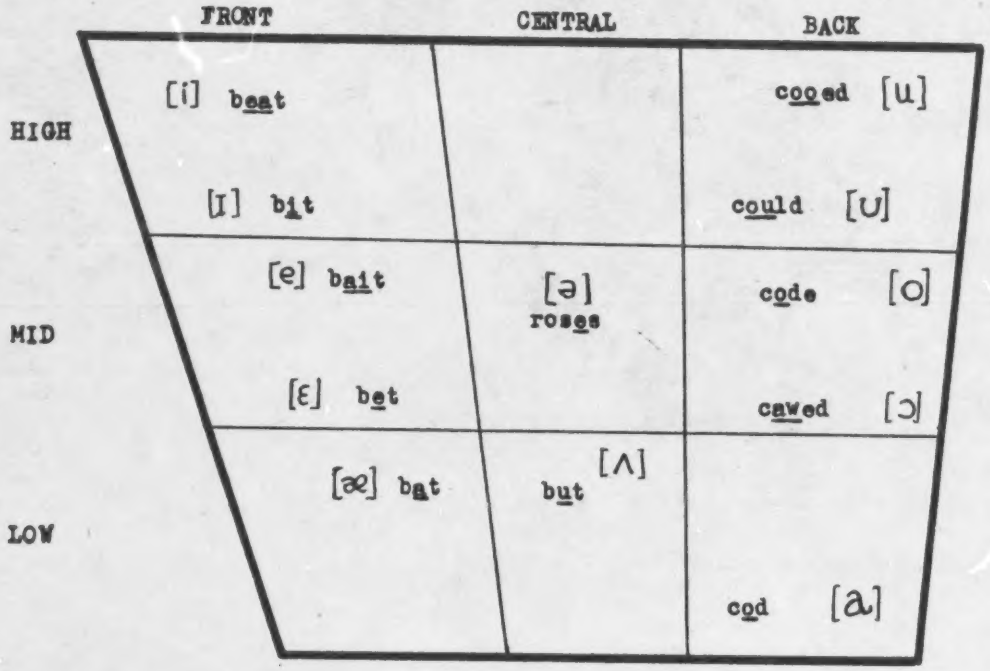


Figure 13.*

*Ronald W. Langacker, Language and Its Structure, New York: Harcourt, Brace and World, Inc., 1967, p. 145.

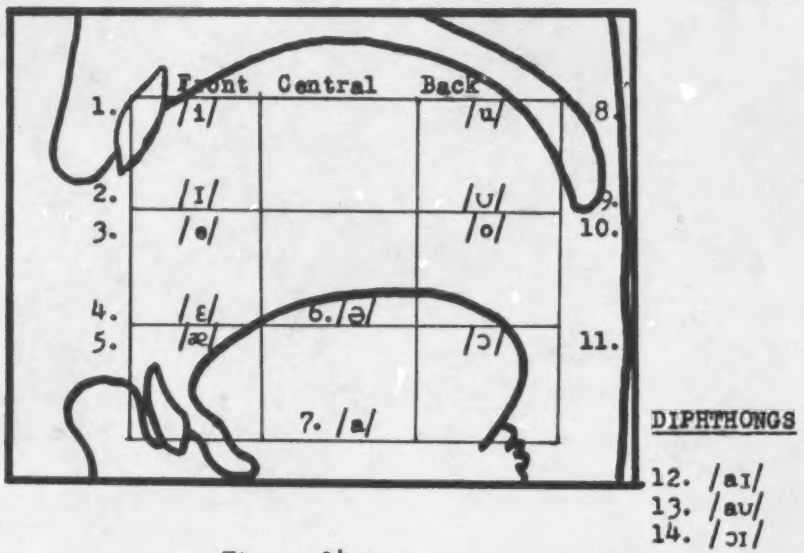


Figure 14.

3.27 According to Allis Bens, "In English there are eleven vowels and three diphthongs."* (Figure 14.) Likewise, Don and Alleen Nilsen indicate eleven vowels of which four are diphthongized, and three diphthongs.** (Figure 15.)

	Front	Central	Back	DIPHTHONGS
Tense HIGH	iy		uw	ay
Lax	i		u	aw
Tense MID	ey		ow	oy
Lax	e	ə		
Tense LOW	æ			
Lax		a	ɔ	

Figure 15.

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*Allis R. Bens, Active English, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1977, p. 1.

**Don Nilsen and Alleen Nilsen, op. cit., p. viii.

3.28 Following is what may be viewed as a "model" diagram. Like all other diagrams, its size and shape are arbitrary. It somewhat resembles the diagram on page 15. (Figure 13.) /a/ is here considered a low central vowel while it is nearly a back vowel as the dot indicates. The central vowel /ʌ/ is placed in parenthesis since /ə/, for reasons of simplicity, may take its place in broad transcription. (See 3.41.)

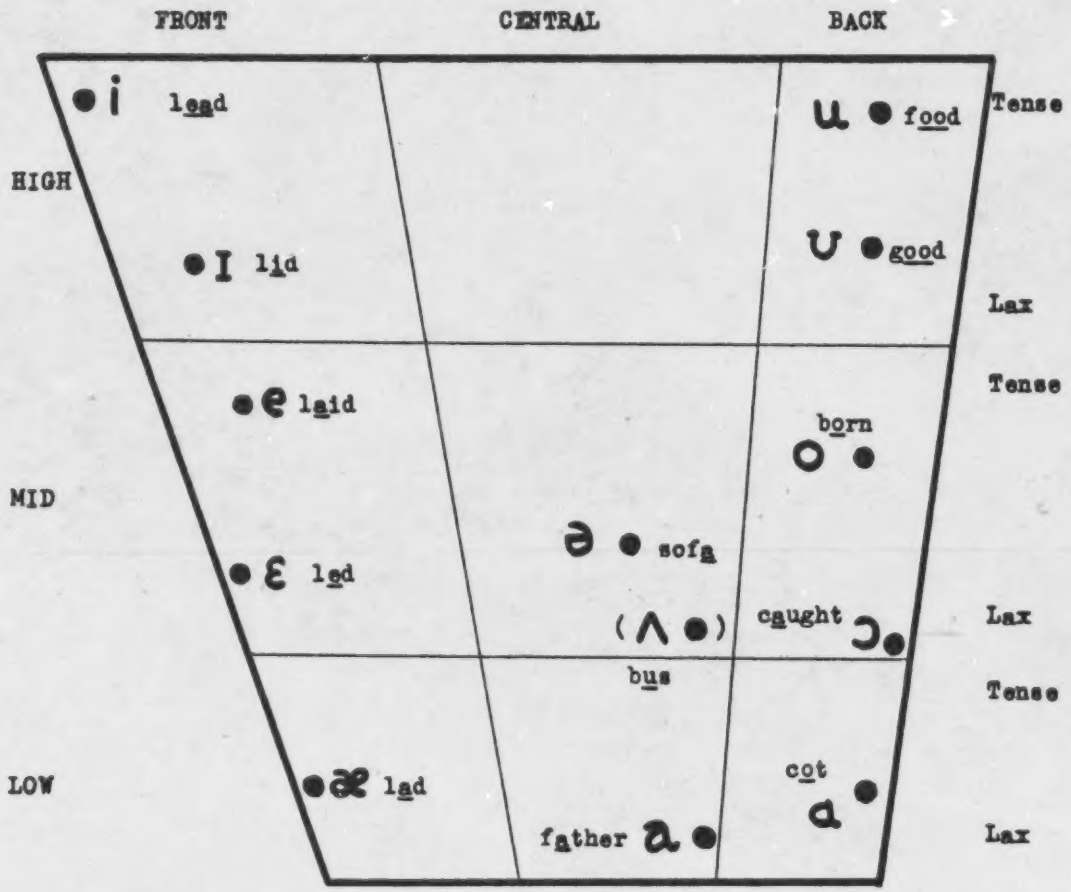

Figure 16.

3.29 When two vowels occupy the same square, the one in the upper half of the square is considered tense, while the one in the lower half lax. The terms refer to the muscular tension of the tongue during the formation of vowels. The tense-lax variation is relevant when applied to vowels in the same square and indicates the relation of those vowels to each other. The muscle tension of the tongue can be felt by pressing your finger against your throat in the area halfway between the chin and your "Adam's apple."

3.30 Front Vowels

3.31 /i/ and /ɪ/ in beat and bit. /i/ is high-front and tense vowel. Lips are spread, mouth is almost closed. /ɪ/ is high-front and lax vowel, made with the tongue slightly lower. /i/ is normally long particularly when followed by a voiced consonant. (See 3.53.)

3.32 /e/ and /ɛ/ in bait and bet. /e/ is mid-front and tense. Lips are spread less than they are for /i/. It is the first sound of the diphthong /eɪ/ in late, where it receives primary or secondary stress. This breaking of /e/ into a diphthong occurs in the speech of the majority of the speakers of American and Southern British English. /ɛ/ is mid-front and lax. The tongue is lower than it is for /e/.

3.33 /æ/ in hat and add. The vowel /æ/ is low-front, and is normally considered a lax vowel. The tongue blade is slightly lower than, and retracted from, the position for /ɛ/.

3.40 Central Vowels

3.41 The Schwa Vowel /ə/ in alone and /ʌ/ in sun. /ə/ is mid-central and lax. It is probably best described as the vowel made with the articulators in neutral position. It is called the schwa vowel, weak, unstressed. /ʌ/ is low-mid, back-central, lax. It occurs in stressed syllables in words such as trust, cut, but. The word above contains both these vowels, a being unstressed, o stressed ([əbʌ́v]). Lips are unrounded. /ə/ or /ʌ/ may be the most difficult vowels for the foreign student to master. Rules, the constant request of the ESL student, are lacking for the application of /ə/ as used in American English. Some phoneticians prefer to use /ə/ in place of /ʌ/, perhaps for reasons of simplicity (page 16), as is the case with placing /ʌ/ in parenthesis in the model diagram. (Figure 16.)

3.42 /a/ in father. This vowel, as shown in the various diagrams, is sometimes classified as a low back vowel (Figure 13); as a low front or front-central vowel (Figure 11); or as a low central vowel (Figures 14 and 15). Since it is an unrounded vowel, it will be classified here as low central-back, lax vowel. Roundness would thus be a distinctive feature of all back vowels. /a/ is the lowest vowel in English.

3.43 Charles Thomas comments that "No single word can be used to illustrate [a] in American English, since many Americans do not use it at all, and others use it as an allophone of either the phoneme [æ] [sic] or the phoneme [ɑ] [sic],"* but goes on to say that the use of /a/ as in hot, lock, and odd occurs in certain regions of U.S.A.--California is not mentioned--, while outside those regions it is regarded substandard.**

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*Charles Kenneth Thomas, Phonetics of American English (sec. ed.), New York: The Ronald Press Company, 1958, p. 115.

**Ibid., p. 117.

3.50 Back Vowels

3.51 /ɑ/ in cot and /ɔ/ in caught. /ɑ/ is a low-back lax vowel. Lips are barely rounded to slightly rounded. The tongue is a little higher than it is for /a/ and about the same height as /æ/. In certain regions of U.S.A. /ɑ/ is heard as /a/, not differentiating the a in father from the o in cot. (See 3.43.) In perception, /ɔ/ is confused most frequently with /ɑ/. Though the phonetically conscious Californian would differentiate /ɔ/ from /ɑ/, the majority of the others would consider them the same sound. The vowel /ɔ/ is formed with a slight, though definite, rounding of the lips, with the tongue slightly higher than it is for /ɑ/. /ɔ/ is here considered a mid-back and lax vowel, though it may be seen as either a lax or a tense vowel. (Compare Figure 13 with Figure 14.) However, if the ESL teacher is concerned with further simplifying the model diagram, he may simply eliminate /ɑ/, thus contrasting /ɔ/ with /a/. (See Figure 13, 14, or 15.)

3.52 /o/ in horn, opinion, and show. /o/ is a tense mid-back vowel. Lips are rounded and often protruded. It is the first sound of the diphthong /ou/ in flow. The pure /o/ vowel may occur in unstressed syllables such as the o in obey or opinion, though it may also be heard as /ə/. It may also occur in final unstressed syllables such as yellow or window, though generally it is diphthongized. In words such as bolt or sold it may be heard as pure or diphthongized.

3.53 /ʊ/ in book and /u/ in food. /ʊ/ is high-back and lax, /u/ is tense. Lips are rounded and may be protruded. /ʊ/ is slightly lower and fronted when compared with /u/. The latter is actually diphthongized in character when stressed and lengthened, phonetically transcribed as [ʊu]. (As such, it compares with the highest front vowel /i/ which, when diphthongized, assumes the form [ii].)

3.60 Diphthongs

3.61 /ɔɪ/ /eɪ/ /ou/ /aʊ/ /aɪ/

"Roy may go out tonight." As one says this sentence, the tongue performs a gliding action as it moves from the first sound of each of these five diphthongs to the second sound. Too, the stress recedes or falls from the stressed part to the unstressed part of the glide. These glides are known as falling diphthongs, and include those ending in /ə/ or /ər/. /eɪ/ and /ou/ are sometimes called incomplete diphthongs, when the monophthongs /e/ and /o/ are followed by a slight off-glide, in narrow transcription written as [eᴵ, oᵁ], instead of the full diphthongal form. In this paper we will be concerned with the five complete, falling diphthongs. The rising diphthong /ju/ as in few and beautiful may be seen in Figure 17, however.

3.62 All five of these diphthongs are generally in the speech of the average Californian, though with varying degrees of diphthongization. Some phoneticians, however, prefer to treat /eɪ/ and /ou/ as monophthongs, phonemically transcribing them /e/ and /o/ respectively. (Figure 19.)

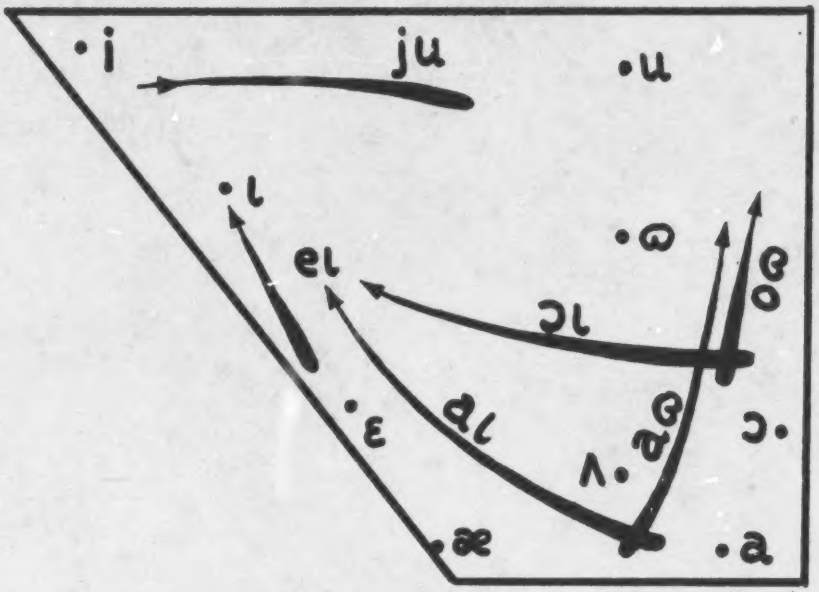
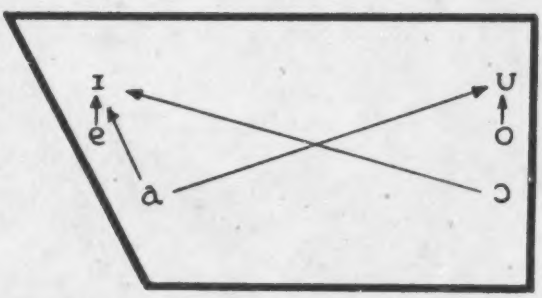
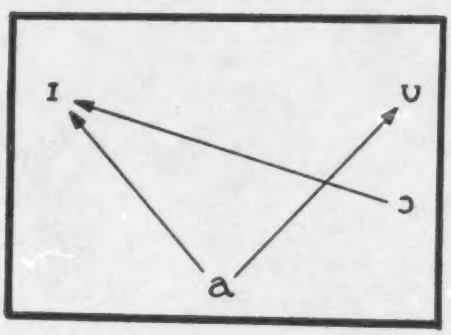


Figure 17.*



← Figure 18.**

Figure 19.***



*Peter Ladefoged, Professor of Phonetics, University of California, Los Angeles, California. (From a handout at a lecture in San Francisco in '75.)

**Arthur J. Bronstein, op. cit., p. 196.

***Allis A. Bens, op. cit., p. 1.

Charles Thomas comments, "Some phoneticians have noticed the [eɪ] and [oʊ] glides, but have failed to notice the more subtle [ɪi] and [ʊu]."* (These were discussed in 3.53.) "There is no ambiguity," he continues, "in transcribing [pil] for peel, [pel] for pail, [pol] for pole, or [pul] for pool. Any diphthongal transcription of these four vowel phonemes is chiefly useful in calling the attention of the foreigner to their stylistic value, and in dialect studies....When, however, we compare pound [paʊnd] with pond [pɑnd], oil [ɔɪl] with all [ɔl], and life [laɪf] with the New England pronunciation of laugh [laf], we see that the difference between a diphthong and a monophthong may have meaningful significance."** Allis Bens, as mentioned earlier (3.25), states that there are three diphthongs in English. Since we are dealing with foreigners, however, the ESL instructor must call the student's attention to their value, teaching him all five falling diphthongs. Since the student may hear these diphthongized, it is only logical that he should also see them transcribed as diphthongs.

Suggestions and Comments

Regarding vowel charts and figures, one may adhere to the ones that seem suitable. He may even formulate his own vowel chart. What is important here is that the student should learn that tongue positions in the production of vowels are essential. A simple picture may also be a clear picture. Simplicity therefore should be considered an advantage. It is probably for this reason that some experts have chosen not to differentiate /ʌ/ from /ə/. (See page 16.)

As the instructor reaches with his class this point of study, he may want to create a repertoire of key words for routine practice. Certain vowels such as /i/, /a/, /ɑ/, and perhaps /u/ may not pose problems. It is the contrast with their tense or lax counterparts that he should pursue to emphasize. For obvious reasons, the contrast /æ/:/ɔ/ as in bat and bought might not be necessary. The /ʌ/:/ɔ/ contrast as in but and bought, on the other hand, would definitely serve a purpose.

Diphthongs may be taught along with vowels, though they should be especially emphasized. Drilling is needed in teaching each diphthong as being part of the same syllable, not two separate vowels. Falling diphthongs are "glides," and the gliding action should be defined and understood as a continuous glide that blends two vocalic elements. It is here recommended that one teach all five falling diphthongs as well as /ju/. An instructor might prefer that his students do not get "bombarded" with details such as the diphthongized /i/ and /u/, at least not in the beginning. It would be inadvisable, however, to portray all English vowels as "pure" vowels while students might hear them diphthongized.

A final word concerning diagrams. Figure 16 is especially recommended here first because one may use /ə/ in place of /ʌ/, and second because it points out the differentiation between /a/, /ɑ/, and /ɔ/ as in father, cot, and caught, respectively. If in one's idiolect there is no differentiation between /a/ and /ɑ/, he may want to render a diagram reflecting his own adjustments. Concerning diphthongs, Figure 17 is recommended. One may use /ʊ/ instead of /ω/.

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*Charles Kenneth Thomas, op. cit., p. 139.

**Ibid., p. 141.

PART IV

4.00 DESCRIPTION OF CONSONANTS

4.10 Introduction

4.11 As in the case of the description of vowels, the use of pictorial illustrations in the description of consonants is also highly important. Though each consonant can be taught individually, voiceless-voiced pairs should be taught first. This voiceless-voiced distinction pertains to consonants and is the only single difference between two consonants whose place and manner of articulation are identical. Pictures and diagrams outlining the articulators involved, therefore, can be used very effectively--as well as economically.

4.12 During the production of consonant segments, the active articulators are principally the lower lip and the tongue. The passive articulators are the upper lip, the upper teeth, the roof of the mouth, and the back wall of the throat or pharynx. Thus "place" is short for "place of production" and "manner" is short for "manner of production."

4.13 In identifying the manner of articulation the following terms are normally used: stop (or plosive), fricative, affricate, glide (or approximant), nasal, and so on. In identifying the place of articulation the following terms are used: labial (or bilabial), labiodental, dental, alveolar (at the tooth ridge), palatal, velar, glottal, and so on. The term dental is used, for example, when the passive articulator is the upper teeth; velar, when the passive articulator is the velum; and so forth. /b/ is then a voiced bilabial stop; /f/ a voiceless labiodental fricative; and /m/ a voiced bilabial nasal, for instance.

4.14 Though the ideal thing would be to teach specialized terminology along with simplified explanations, it can be dispensed with--at least in the beginning. Using the term velar, for instance, would be all right even from the start, though it is part of the specialized nomenclature. But using the term apicoalveolar could be brushed aside, depending on the make-up of the class, resorting to simple explanations such as "touch the upper gums with the tip of your tongue." Regardless of how one would go about teaching his or her ESL class regarding the articulation of consonants, the following three points should be analyzed:

1. Is the consonant voiceless or voiced ?
   (Vocal cords are (not) in vibration)

2. Which articulators are involved ?
   (Place of articulation)

3. Is it a nasal, fricative, bilabial, etc. ?
   (Manner of articulation)

4.15 The last question, "Is it a nasal, bilabial, etc.?" leads to another important point here. To further generalize or simplify the classification of consonants (as well as the terminology used), one may resort to using the terms stop and continuant in a rather broad sense to classify them into two categories. Thus a fricative is also a continuant, and so is a nasal; a plosive is a stop, and so is an affricate. This distinction is especially important in teaching the difference between watch and wash, or the j in major versus the s in measure. Table 4 indicates that such a general classification is justifiable.

Table 4

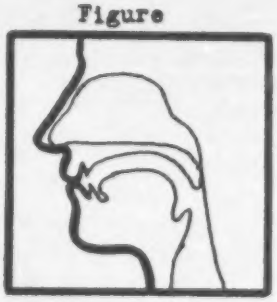
Voiceless and Voiced Stops and Continuants

VL	VD	
/p/	/b/	STOPS
/t/	/d/	
/k/	/g/	
/č/	/ǰ/	
/š/	/ž/	CONTINUANTS
/s/	/z/	
/f/	/v/	
/θ/	/ð/	
/h/		
	/w,y,r,l,m,n,ŋ/	

4.20 Stops

4.21 Bilabial /p/ and /b/.
Two lips together. /p/ aspirated when in initial position and followed by vowel. Caution against devoicing final /b/. Ex.: pear-bear, cap-cab.

Figure



20. /p, b/

4.22 Alveolar /t/ and /d/.
Tip of tongue on tooth (alveolar) ridge. /t/ aspirated when in initial position and followed by vowel. Caution against devoicing final /d/. Ex.: ten-den, bet-pet. Teach /t/ and "voiced t" as in better, butter, etc.

21. /t, d/

4.23 Velar /k/ and /g/.
Back of tongue touches velum. /k/ aspirated when in initial position and followed by vowel. Caution against devoicing final /g/. Ex.: cot-got, lock-log. /k, g/

22.

4.24 Palatal /č/ and /j/.
Also called affricates. Blade of tongue against palato-alveolar area. Ex.: cheap-jeep, church-judge. /č, j/

23.

4.30 Continuants

4.31 Palatal /š/ and /ž/.
Fricatives. Friction of air between blade of tongue and palato-alveolar area. Sides of tongue touch molars. Ex.: shop, push, vision, beige. /š, ž/

24.

4.32 Alveolar /s/ and /z/.
Fricatives. Also called sibilants. Friction of air between tip of tongue and tooth ridge. Ex.: sip-zip, sue-zoo, bus-buzz. /s, z/

25.

4.33 Labiodental /f/ and /v/.
Fricatives. Friction of air between middle of lower lip and upper front teeth. Ex.: fan-van, leaf-leave. /f, v/

26.

4.34 Dental /θ/ and /ð/.
Fricatives. Friction of air between tip or blade of tongue and upper front teeth. Ex.: thigh-thy, ether—either. /θ, ð/

27.

4.35 Glottal /h/.
Fricative. /h/ has no characteristic position of the speech organs in the mouth, but takes the mouth position of whatever sound follows it. Ex.: at-hat, all-hall. /h/

28.

Figure

4.36 Bilabial-velar /w/.*
Approximant. Also called a glide. Double articulation; lips and back of tongue simultaneously. Lips are protruded, back of tongue near velum. Its voiceless counterpart is /hw/, used in words beginning with wh- (when, where, etc.). Sometimes /h/ and /w/ blend so closely that they lose their separate identities in /hw/, and merge into a single sound /ʍ/, a voiceless counterpart of /w/. Many people prefer to use /w/ in weather and /hw/ (/ʍ/) in whether. The use of /w/ in when, somewhat, etc. is often considered substandard in America.

29. /w/

4.37 Palatal /y/.*
Approximant. Also called a glide. Tongue center touches hard palate and glides to the vowel that follows it. Some foreigners may not hear the difference between yeast and east or year and ear.

30. /y/

4.38 Palatoalveolar /r/.
Approximant. Also called a glide. (Sometimes the fricative /ɹ/ is used, but for convenience, and as is commonly used among experts, the retroflex /r/ is here employed.) The tip of tongue is near the hard palate or the palatoalveolar area, while pointing upward or upward and backward.

31. /r/

4.39 Alveolar /l/.
Also known as a lateral, because it permits the exit of air on one or both sides of the tongue, the tip or blade of tongue being against the alveolar ridge.

32. /l/

4.39.1 Nasal /m/, /n/, and /ŋ/.
Escape of air stream through the nasal passages, the mouth passage being entirely blocked: by the lips, as in mom; by the tip and sides of tongue, as in nun; or by the tongue back and velum, as in sing. /n/ is an alveolar formed in much the same way as /l/, except the sides of the tongue in /l/ are not in contact with the palate.

33. /m/

34. /n/

35. /ŋ/

---

*/w/, /ʍ/, and /y/ are uttered so rapidly that the term continuant may not well apply. Huge and human may be pronounced with /hy/ or /ç/, the latter being a voiceless palatal frivative.

Suggestions And Comments

The above description of consonants is an attempt to furnish the ESL teacher with the most significant aspects of their articulation. It is meant to serve as a quick source of information that might provide a helpful hint now and then. Though far from being as nearly complete in the sense of detailed analysis as an informative textbook on the subject, it nevertheless, accompanied with the self-explanatory figures, is what the ESL student might need for now, until he chooses to go beyond the basics and pursue a deeper insight or perhaps specialized training in the field.

It is customary to represent schematically the consonants in the form of a table such as the one below. (Table 5.) This is actually a summary of the above attempted description. Most of the terms appearing in the parentheses are specialized and are included, as it were, optionally. The affricates /č, j/ are listed as stops. (See 4.15.)

Table 5.

The Consonants of English

two lips (bilabial)	bottom lip/top teeth (labiodental)	tongue tip/top teeth (apicodental)	tongue tip/top teeth (apico-alveolar)	tongue tip/tooth ridge (retroflex)	tongue tip/hard palate	tongue center/hard palate (palatal)	tongue back/soft palate (dorsovelar)	tongue blade/tooth ridge (lamino-palatoalveolar)	not localized	
										STOPS
p			t			k	č			Voiceless
b			d			g	j			Voiced
										CONTINUANTS
(ʍ)	f	θ	s		š				h	Voiceless
w	v	ð	z l	r	y ž					Voiced (Oral)
m			n			ŋ				Voiced (Nasal)

There is no doubt that each individual figure or diagram plays a very important role in teaching pronunciation to the ESL student, as has been repeatedly mentioned. But the figure that best summarizes all of the above information on consonants may be Figure 36. One may find it as effective as it is simple.

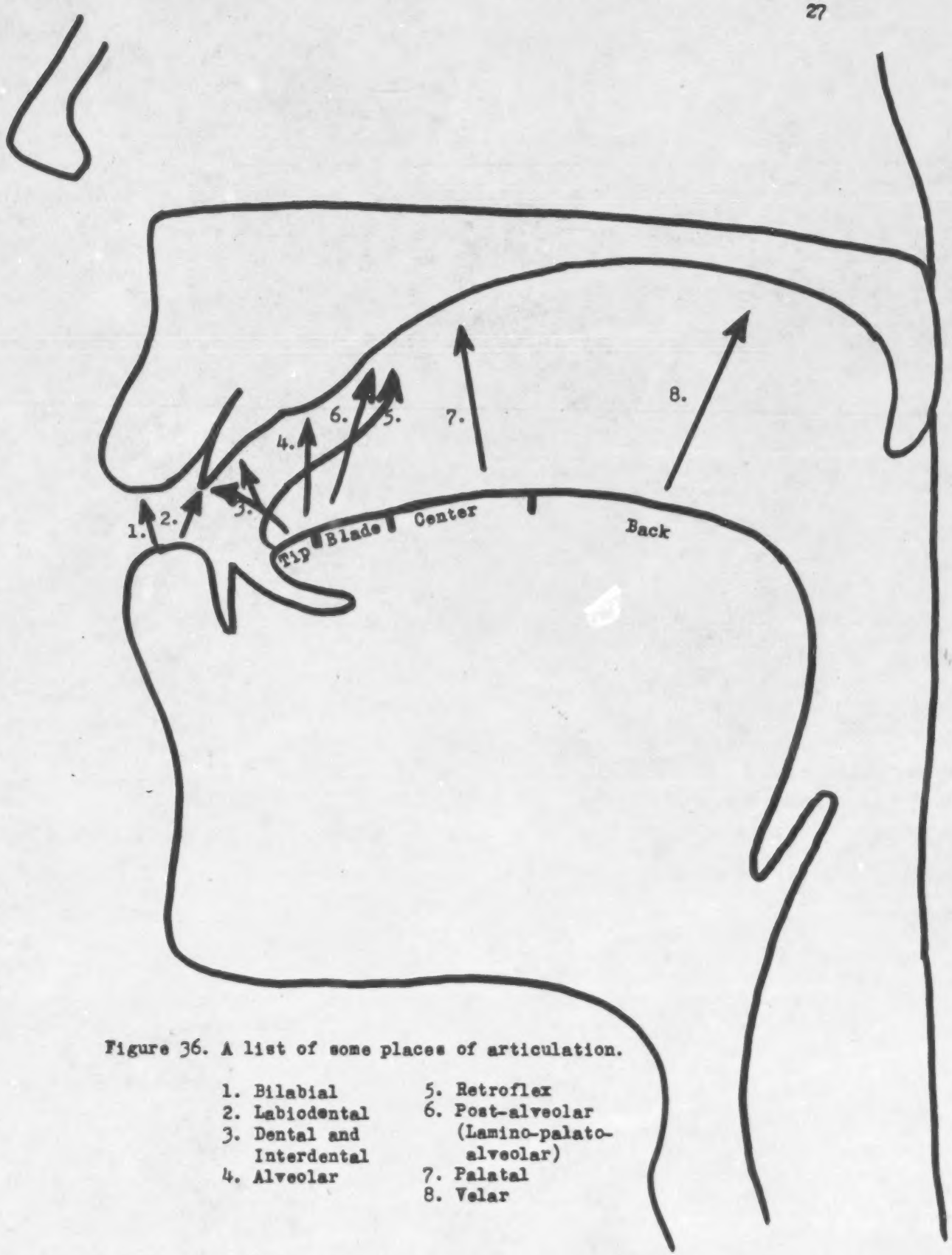


Figure 36. A list of some places of articulation.

1. Bilabial
2. Labiodental
3. Dental and Interdental
4. Alveolar
5. Retroflex
6. Post-alveolar (Lamino-palato-alveolar)
7. Palatal
8. Velar

PART V

5.00 MINIMAL PAIRS

5.10 Definition and Purpose

5.11 A minimal pair consists of two words pronounced alike except for a single phonemic difference. The difference may be a vowel (beat-bit) or a consonant (bit-pit).

5.12 The idea underlying the teaching of pronunciation contrasts to the ESL student by means of minimal pairs is extremely important; the student should be taught the correct pronunciation of a word first in isolation and then in conversation. In isolating the word(s) of a minimal pair, one also isolates, and therefore emphasizes, the single sound he wants to analyze and teach.

5.13 In examining a minimal pair, one should consider the degree of difference between two words. There is only one difference between bit and pit, for instance. /b/ is a voiced bilabial stop, whereas /p/ is a voiceless bilabial stop. Obviously bit and sit are also a minimal pair, but their difference is more than just a single consonant; /b/ is a voiced bilabial stop, whereas /s/ is a voiceless alveolar fricative. /b/ and /p/ are said to be homorganic sounds (i.e., produced with the same articulators). One would prefer to start teaching minimal pairs involving voiceless-voiced homorganic consonants as the single difference between each pair.*

5.14 The lists of minimal pairs that follow are not exhaustive. They are, however, more than just "a couple," and are meant to serve as samples ready for use. One may consult the works listed in the bibliography at the end of this paper. The lists are divided into two major sections, one on the vowels and the other on the consonants. Though there can be found many more minimal pairs further involving non-homorganic consonants, a few such lists are also included. The benefit of longer lists is a more comprehensive vocabulary. Otherwise the limited number of minimal pairs that follow will suffice initially as one pursues to teach primarily the sounds. In the course of teaching minimal pairs it will be found that the students come across the same words frequently, thus learning words they might otherwise not learn.

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*This point about homorganic sounds will prove important in explaining the pronunciation of mitten as mitt'n or of hidden as hidd'n, for instance. Since /t/ and /n/ or /d/ and /n/ are homorganic--they are apicoalveolars--, there is no need for the intervening vowel ə since we can proceed from the position of the tongue for /t/ or /d/ to the position of the tongue for /n/. /n/ now becomes syllabic, transcribed [n̩].

Sample Minimal Pairs
Given in Arbitrary Order

5.20 **Front Vowels**

5.21 /i/ɪ/ɪ/

beat-bit
bead-bid
seek-sick
leak-lick
peak-pick
peach-pitch
beach-bitch
week-wick
ease-is
peel-pill
feel-fill
deal-dill
keel-kill
seal-sill
seen-sin
seat-sit
lead-lid
deed-did
least-list
leave-live
reach-rich
cheek-chick
bean-bin
meal-mill
teen-tin
leap-lip
sleep-slip
green-grin
heat-hit
feet-fit
neat-knit
he's-his
each-itch
eel-ill
heap-hip
eat-it

5.22 /ɪ/ɪ/eɪ/

lid-laid
mid-maid
give-gave
kick-cake
lick-lake
brick-brake
sick-sake
stick-steak
wick-wake
it-ate
fill-fail
skill-scale
mill-mail
sill-sail
still-stale
chin-chain
kiss-case
grin-grain
bit-bait
rip-rape
kin-cane
pin-pane
ship-shape
tip-tape
hit-hate
mix-makes
dim-dame
fist-faced
pill-pail
bill-bail

5.23 /eɪ/ɪ/ɛ/

late-let
raced-rest
fade-fed
mate-met
hail-hell
shade-shed
sprayed-spread
wage-wedge
age-edge
rake-wreck
gate-get
bait-bet
date-debt
ail-L
bail-bell
fail-fell
spade-sped
tale-tell
aid-Ed
laid-led
lade-lead
sale-sell
raid-red
blade-bled

5.24 /ɛ/ɪ/æ/

dead-dad
bed-bad
ten-tan
Ken-can
Ben-ban
Beth-bath
X-axe
bet-bat
led-lad
flesh-flash
wrench-ranch
guess-gas
sex-sacks
pled-plaid
end-and
said-sad
set-sat
vest-vast
slept-slapped
pest-past
adept-adapt
bend-band
send-sand
peck-pack
met-mat
blend-bland
blessed-blast
net-gnat
dense-dance
leather-lather
pen-pan

5.25 /i/ɪ/eɪ/

beat-bait
feat-fate
meet-mate
lead-laid
peace-pace
spree-spray
wheel-whale
seal-sail
seen-sane
leak-lake
treat-trait
street-straight
tree-tray

5.30 Front and Central Vowels

5.31 /ɪ/:/ʌ/

bit-but
rib-rub
bid-bud
mid-mud
live-love
stiff-stuff
big-bug
lick-luck
dig-dug
rig-rug
ring-rung
sing-sung
fin-fun
pin-pun
pinch-punch
trick-truck
sting-stung
sick-suck
mink-monk
shrink-shrunk
drink-drunk
sink-sunk
slim-slum
dim-dumb
bin-bun
wrist-rust
knit-nut
this-thus
kit-cut
mist-must
simmer-summer
win-won
sin-sun

5.32 /eɪ/:/ʌ/

raced-rust
traced-trust
place-plus
ace-us
stayed-stud
blade-blood
made-mud
bake-buck
lake-luck
game-gum
sane-sun
shave-shove
Kate-cut
case-cuss
ape-up
maim-mum
gain-gun
plague-plug
days-does
bait-but

5.33 /ɛ/:/ʌ/

bet-but
better-butter
bled-blood
messed-must
beg-bug
bench-bunch
deck-duck
flesh-flush
desk-dusk
hem-hum
Ben-bun
ten-ton
best-bust
net-nut
rest-rust
guest-gust
many-money

5.34 /æ/:/ʌ/

bat-but
bad-bud
rag-rug
gassed-gust
stand-stunned
badge-budge
rang-rung
staff-stuff
ankle-uncle
drag-drug
hag-hug
hang-hung
sang-sung
match-much
crash-crush
branch-brunch
back-buck
lack-luck
track-truck
sack-suck
flash-flush
rash-rush
stack-stuck
bank-bunk
drank-drunk
task-tusk
gal-gull
ham-hum
fan-fun
ran-run
pan-pun
cap-cup
damp-dump
ram-rum

5.35 /æ/:/aɪ/

dad-died
lamb-lime
laugh-life
lack-like
had-hide
lad-lied
canned-kind
add-I'd
sad-side
land-lined
band-bind
strap-stripe
tap-type
fan-fine
van-vine
ass-ice
flat-flight
mass-mice
as-eyes
mat-might
gnat-night
rat-right
pant-pint
sat-sight
lax-likes
brat-bright
hat-height
bat-bite
cat-kite

5.40 Central Vowels

5.41 /ʌ/:/aɪ/

cut-kite
love-live
muck-mike
hut-height
luck-like
but-bite
nut-night

sun-sign
fun-fine
rum-rhyme
shun-shine
buck-bike
struck-strike
done-dine
duck-dike
mutt-might
mull-mile
num-nine

5.50 Back Vowels

5.51 /ɑ/:/ɔ/

odd-awed
cot-caught
ah-awe
stock-stalk
Don-dawn
not-naught
cod-cawed

5.52 /ɔ/:/oʊ/

call-coal
scald-scold
bald-bold
stall-stole
ball-bowl
caught-coat
fall-foal
bought-boat
law-low
lawn-loan
gall-goal
raw-row
saw-sow
fawn-phone
hall-whole

5.53 /oʊ/:/ɔɪ/

bowl-boil
old-oiled
bold-boiled
sold-soiled
soul-soil
cone-coin
nose-noise
nosy-noisy
foal-foil
toll-toil
most-moist
bow-boy
toe-toy
Joe-joy
Joan-join

5.54 /oʊ/:/ʊ/

coke-cook
pole-pull
foal-full
code-could
bowl-bull
showed-should
hoed-hood
croak-crook

5.55 /ʊ/:/u/

should-shoed
hood-who'd
look-Luke
full-fool
pull-pool

5.56 /ɔ/:/ɔɪ/

ball-boil
bald-boiled
all-oil
fall-foil
tall-toil
bawl-boil
brawl-broil
lawn-loin
jaw-joy
saw-soy
raw-Roy
call-coil

5.60 Central and Back Vowels

5.61 /ʌ/:/ɑ/

hut-hot
cut-cot
nut-not
cup-cop
duck-dock
fund-fond
rub-rob
come-calm
hug-hog
pup-pop
done-Don
stuck-stock
luck-lock
rubber-robber
nut-not
bucks-box
mum-mom
suck-sock
dull-doll

5.62 /ʌ/:/ʊ/

buck-book
stud-stood
luck-look
Huck-hook
tuck-took

5.63 /ʌ/:/oʊ/

but-boat
rub-robe
struck-stroke
come-comb
fun-phone
gull-goal
hum-home
none-known
flood-flowed
cussed-coast
dumb-dome
ton-tone
bun-bone
must-most
does-doze
rust-roast
gust-ghost
bust-boast

5.64 /ʌ/:/ɔ/

cussed-cost
cuff-cough
done-dawn
lung-long
tuck-talk
stuck-stalk
bus-boss
crust-crossed
cut-caught
sung-song
dug-dog
lust-lost

5.70 Diphthongs

5.71 /eɪ/:/oʊ/

came-comb	
brake-broke	
gaze-goes	
cane-cone	
raise-rose	
bail-bowl	
fail-foal	
rail-roll	
sale-soul	
rape-rope	
taste-toast	
rate-wrote	
lane-loan	
fake-folk	
stale-stole	
cake-coke	
laid-load	
raced-roast	
slay-slow	
days-doze	
lay-low	
say-so	
cane-cone	

5.72 /aʊ/:/ɔɪ/

owl-oil	
foul-foil	
loud-Lloyd	
bough-boy	
vowed-void	

5.73 /aʊ/:/aɪ/

found-find	
bow-by	
down-dine	
bough-buy	
crowd-cried	
spouse-spice	
louse-lice	
mouse-mice	
noun-nine	
bound-bind	
sound-signed	
owl-isle	
how-high	
round-rind	
found-fined	

5.74 /ɔɪ/:/aɪ/

boy-buy	
oil-aisle	
foil-file	
loiter-lighter	
loin-line	
coined-kind	
point-pint	
Roy-rye	
toy-tie	
soy-sigh	
lawyer-liar	

5.75 /oʊ/:/aʊ/

bow-bow	
sow-sow	
known-noun	
no-now	
phoned-found	
foal-foul	
tone-town	
drone-drown	
load-loud	

5.80 Multiple Contrasts of Vowels and Diphthongs

5.81 Front Vowels

/i/	/ɪ/	/eɪ/	/ɛ/	/æ/
beat	bit	bait	bet	bat
lead	lid	laid	led	lad
deed	did	-----	dead	dad
heed	hid	-----	head	had
read	rid	raid	red	-----
greed	grid	grade	-----	grad
peak	pick	-----	peck	pack
leak	lick	lake	-----	lack
meet	mitt	mate	met	mat
peel	pill	pail	-----	pal
feel	fill	fail	fell	-----
heel	hill	hail	hell	Hal
deem	dim	dame	-----	dam
eat	it	ate	-----	at

/i/	/ɪ/	/eɪ/	/ɛ/	/æ/
bean	bin	bane	Ben	ban
keen	kin	cane	Ken	can
feast	fist	faced	-----	fast
seat	sit	sate	set	sat
feet	fit	fate	-----	fat
least	list	-----	lest	last
neat	knit	Nate	net	gnat
heat	hit	hate	-----	hat
he's	his	haze	-----	has
teen	tin	-----	ten	tan
bead	bid	bayed	bed	bad
feed	-----	fade	fed	fad
deal	dill	dale	dell	-----

5.82 Back and Central Vowels

/ɑ/	/ɔ/	/oʊ/	/ʊ/	/u/	/ʌ/
-----	bought	boat	-----	boot	but
cot	caught	coat	-----	-----	cut
shod	-----	showed	should	shoed	-----
-----	Paul	pole	pull	pool	-----
-----	-----	dome	-----	doom	dumb
-----	-----	-----	stood	stewed	stud
cod	cawed	code	could	cooed	cud
lock	-----	-----	look	-----	luck
clock	-----	cloak	-----	-----	cluck

5.83 Diphthongs

/eɪ/	/aɪ/	/ɔɪ/	/aʊ/	/oʊ/
play	ply	ploy	plow	-----
say	sigh	soy	sow	sew
raid	ride	-----	-----	road
bay	buy	boy	bow	bow
fail	file	foil	foul	foal
lane	line	loin	-----	loan
bait	bite	-----	bout	boat
dale	dial	Doyle	-----	dole
laid	lied	Lloyd	loud	load

5.90 Consonants

5.91 /p/:/b/

Initial
pack-back
pad-bad
pail-bail
pan-ban
pair-bear
pear-bare
pat-bat
path-bath
pay-bay
peach-beach
peak-beak
pet-bet
punch-bunch
pill-bill
pony-bony

Medial
staple-stable
simple-symbol
roped-robed

Final
rope-robe
cap-cab
lap-lab
cop-cob
swap-swab
rip-rib
mop-mob
pup-pub

5.92 /t/:/d/

Initial
tear-dear
tear-dare
ten-den
tie-die
tide-died
tied-dyed
tip-dip
tried-dried
train-drain
sweeten-Sweden

Medial
seating-seeding
betting-bedding
latter-ladder
putting-pudding

Final
at-add
bat-bad
neat-need
beat-bead
debt-dead
bet-bed
let-led
cot-cod
cart-card
built-build
bright-bride
hat-had
seat-seed
threat-thread
hit-hid
sat-sad

5.93 /k/:/g/

Initial
cap-gap
clue-glue
cot-got
crane-grain
could-good
crow-grow
crab-grab
coat-goat
cause-gauze
come-gum

Medial
decree-degree
plucking-plugging
backing-bagging
tucking-tugging

Final
back-bag
pick-pig
buck-bug
duck-dug
tack-tag
rack-rag
lack-lag
leak-league

5.94 /č/:/j/

Initial
chin-gin
chain-Jane
cheer-jeer
cheap-jeep
choke-joke
choice-Joyce
chunk-junk

Medial
riches-ridges
lunches-lunges

Final
rich-ridge
march-Marge
lunch-linge

5.95 /š/:/ž/

(No minimal pairs)
sure azure
marsh beige

mission vision
caution erosion
motion explosion
cash barrage
lush casual
plush usual
rush corsage
cashier treasure
brush pleasure
wash rouge

5.96 /s/:/z/

Initial
sip-zip
sewn-zone
sink-zinc
sue-zoo
sipped-zipped

Medial
racing-raising
races-raises
prices-prizes
lacy-lazy

Final
race-rays
peace-peas
ice-eyes
fierce-fears
sauce-saws
dose-doze
loose-lose
bus-buzz
cease-seize
loss-laws

5.97 /f/:/v/

Initial
fairy-very
fan-van
fee-V
feel-veal
ferry-vary
fine-vine
few-view
final-vinyl

Medial
rifle-rival
infest-invest
safer-saver
shuffle-shovel

Final
safe-save
fife-five
relief-relieve
belief-believe
grief-grieve
leaf-leave
proof-prove

5.98 /θ/:/ð/

Initial
thigh-thy

Medial
ether-either

Final
teeth-teethe
smooth
clothe
both
booth
bath
bathe
loathe
growth
thought
theater
this
lathe
lather
leather
throw
throne
through
though

5.99 /h/

hold-old
hat-at
heat-eat
hit-it
hate-ate
howl-owl
heel-eel
hill-ill
hay-A
hide-I'd
whose-ooze
hell-L
hear-ear
hitch-itch
hone-own
hurl-earl

5.99.1 /w/:/hw/

(Optional)
whale-wail
whether-weather
wheel-we'll
where-wear
what-watt
why-Y
which-witch
whine-wine
wheeled-wield

5.99.2 /y/:/j/

Initial
yak-jack
yam-jam
year-jeer
yolk-joke
use-juice
yacht-jot
yawn-John

Medial
weighed-waged

5.99.3 /l/:/r/

Initial
lack-rack
lace-race
leap-reap
lip-rip
list-wrist
liver-river
late-rate
laid-raid
laughed-raft
lay-ray
lead-read
lie-rye
low-row
lung-rung
light-right
lock-rock
lane-rain
long-wrong

Medial
cloud-crowd
climb-crime
flee-free
clutch-crutch
filing-firing
collect-correct
fly-fry
glass-grass
clash-crash
belly-berry

Final
tile-tire
bill-beer
wall-war
file-fire
role-roar
dial-dire

5.99.4 /n/:/ŋ/

ton-tongue
win-wing
hand-hanged
fan-fang
run-rung
sun-sung
kin-king
sinner-singer
done-dung
lawn-long
sin-sing
ban-bang
ran-rang

5.99.5 /w/:/v/

worse-verse
wail-veil
wet-vet
west-vest
wow-vow
wary-vary
went-vent
wine-vine
wiper-viper
wiser-visor

5.99.6 /θ/:/s/

think-sink
thank-sank
thigh-sigh
thin-sin
thinner-sinner
thought-sought
thick-sick
thumb-some
bath-bass
math-mass
worth-worse
mouth-mouse
tenth-tense

5.99.7 /ð/:/z/

breathe-breeze
clothing-closing
teethe-tease
clothed-closed
clothe-close
soothe-sues

5.99.8 /n/:/l/

night-light
not-lot
no-low
nine-line
notion-lotion
snow-slow
pin-pill
knit-lit
snack-slack
raining-railing
net-let
nice-lice
need-lead
snap-slap
known-loan
N-L
unknown-alone
bone-bowl
tone-toll
seen-seal
fin-fill
sin-sill
in-ill

5.99.9 /č/:/š/

cheep-sheep
cheat-sheet
chew-shoe
hatch-hash
watch-wash
catch-cash
crutch-crush
witch-wish
chose-shows
chop-shop
ditch-dish
match-mash
matched-mashed
watched-washed
chopped-shopped
cheer-sheer
chin-shin
march-marsh

Suggestions and Comments

The ESL instructor can anticipate the numerous benefits in teaching articulatory phonetics through minimal pairs. In examining minimal pairs in general, one may notice a number of things. The average word of a minimal pair, for instance, consists of about four to six letters--small, that is. Furthermore, minimal pairs consist of many common, frequently used words as well as not so common, yet useful words. As most ESL students may agree, the meaning of small-size words, particularly of the less common ones, seems harder to retain than that of long words. Since the words of one minimal pair may sometimes be part of other minimal pairs as well, and since teaching minimal pairs requires considerable repetition, a student is likely to not only learn the pronunciation but also the meaning and simultaneously the spelling of those words. In time he will thus be able to spontaneously make semantic associations of the words both auditorily (by sound) as well as visually (by spelling). When this level of learning has been attained by the students, the instructor may be said to have more than just supported the idea underlying the teaching of minimal pairs--as stated in 5.12; he has assuredly fulfilled the ESL student's psycholinguistic need--mentioned in the beginning of this work.

The student, by the end of such a study, may be said to have advanced to three different stages of a learning process: from learning to perceive the differences between sounds that had previously seemed to sound alike to being able to assign to them phonemic values; and from the latter to being able to reproduce those sounds as all the rest of the English sounds with a degree of accuracy. He has gradually acquired a new habit, as it were, whereby he constantly "sees" what he hears or says. He has learned to visualize at will the words he hears or says, simultaneously associating (parts of) those words with their phonetic transcription, each phonetic symbol of which he mentally associates with a specific function of the speech organs.

Teaching the English sounds and pronunciation contrasts using minimal pairs is not the only method the ESL instructor should necessarily or exclusively pursue, of course. One may elect to apply articulatory phonetics in the area of regular vocabulary exercises, for instance. Or perhaps he may prefer to teach one sound at a time using lists of selected words in an attempt to make visually apparent the correspondence between (vowel*) spellings and sounds.

Finally, as for the teaching of minimal pairs in particular, it is here suggested that the ESL instructor teach them as part of the curriculum, though not necessarily on a daily basis. He may elect to teach the vowels or the consonants first, or in alternation. There is a wealth of ways and methods of teaching minimal pairs as one will discover. However, discussing such methods of teaching at this time would seem beyond the scope of this treatise for lack of space.

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*Available is an excellent handbook on the subject--not included in the bibliography--by Louise Marsh, Rhyme and Reason, Oakland, CA.: California Syllabus, 1976.

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